REMARKS

Claims 1-25 are currently pending in the application. By this amendment, claims 7, 21 and 22 are amended for the Examiner's consideration. The above amendments do not add new matter to the application and are fully supported by the original disclosure. For example, support for the amendments is provided in the claims as originally filed and at pages 1, 5 and 9-11 of the specification. Reconsideration of the rejected claims in view of the above amendments and the following remarks is respectfully requested.

Information Disclosure Statement

It is noted that the Examiner has not indicated consideration of the Information Disclosure Statement submitted on August 21, 2003. Accordingly, Applicants respectfully request that the Examiner consider the documents cited therein and indicate such consideration by returning a signed and initialed copy of the PTO-1449 Form with the next official communication.

35 U.S.C. §103 Rejection

Claims 1-7, 10-13, 17-18 and 20-25 were rejected under 35 U.S.C. §103(a) for being unpatentable over U. S. Patent No. 5,752,025 issued to Shakib *et al.* ("Shakib") in view of U. S. Patent Application Publication No. 2002/0120617 issued to Yoshiyama *et al.* ("Yoshiyama"). Claims 8-9, 14-16 and 19 were rejected under 35 U.S.C. §103(a) for being unpatentable over Shakib in view of Yoshiyama and further in view of U. S. Patent

Application Publication No. 2003/0088739 issued to Wilkes *et al.* ("Wilkes"). These rejections are respectfully traversed.

The Examiner bears the initial burden of factually supporting any *prima facie* conclusion of obviousness. To establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. MPEP §2142.

The Examiner asserts that the applied prior art teaches or suggest all of the features of the claimed invention. Applicants respectfully disagree and submit that the Examiner has failed to establish a *prima facie* case of obviousness.

Independent Claims 1, 7, 18, and 25

The present invention generally relates to optimization of database performance, and more particularly, optimization of performance in non-relational databases. In non-limiting exemplary implementations of the invention, a server provides database access and management control to a non-relational database. The server accepts database inquiries from one or more clients and accesses the database accordingly and returns the results of the inquiry. By reducing the view index size, implementations of the invention may increase efficiencies in processing time, bandwidth and/or memory management.

More specifically, in non-limiting implementations of the invention, at least one view of the database is created by defining columns. The view index size is kept at a level that optimizes database performance by categorizing and sorting only a first subset of the columns contained within the corresponding view. The remaining columns of the view constitute a second subset and are marked as having been indexed, but are not actually used to build the index. The second subset of columns may be visible as collapsed data to a client for issuing a query, since all columns are marked as indexed. When a query is performed on at least one column of the second subset, a sort and categorization of the at least one column is performed. This results in some data being indexed at run time. However, since the second subset of columns are not initially indexed, the total number of indexed records is substantially less, the view index size is reduced, and overall performance is increased.

Independent claim 1 recites, in part,

> ...sorting and categorizing a first set of columns within a view of the database; and
> marking a second set of columns within the view as if the second set of columns were already sorted and categorized prior to actual sorting and categorizing of the second set of columns, the second set of columns including all columns exclusive of the first set of columns.

Independent claim 7 recites, in part,

> ...sorting and categorizing a first set of columns within a view of the non-relational database; and
> marking a second set of columns within the view as if the second set of columns were already sorted and categorized prior to actual sorting and categorizing of the

second set of columns, the second set of columns including all columns exclusive of the first set of columns...

Independent claim 18 recites, in part,

...a component to sort and categorize a first set of columns within a view of the database;
a component to mark a second set of columns within the view, wherein the second set of columns comprises all columns within the view that are not in the first set of columns, and wherein the mark indicates that sorting and categorizing has been performed on the second set of columns without actually having performed the sorting and the categorizing...

Independent claim 25 recites, in part,

...a first computer program code to sort and categorize a first set of columns within a view of a database;
a second computer program code to mark a second set of columns within the view, wherein the second set of columns comprises all columns within the view that are not in the first set of columns, and wherein the mark indicates that sorting and categorizing has been performed on the second set of columns without actually having performed the sorting and the categorizing...

These features are not shown or suggested by the applied references.

The Examiner asserts that Shakib discloses sorting and categorizing a first set of columns within a view of a database. The Examiner admits, and Applicants agree, that Shakib does not disclose marking a second set of columns within the view as if the second set of columns were already sorted and categorized prior to actual sorting and categorizing of the second set of columns, the second set of columns including all columns exclusive of the first set of columns. The Examiner is of the opinion that

Yoshiyama teaches these features at paragraph 35, and that it would have been obvious to modify Shakib by adding these features.

Applicants respectfully disagree and submit that no proper combination of the applied references teaches or suggests all of the features of the claimed invention. More specifically, Applicants note that none of the applied references teaches or suggests marking a second set of columns within a view of a database as if the second set of columns were already sorted and categorized prior to actual sorting and categorizing of the second set of columns.

Shakib discloses a method and system for creating and displaying a table of categorized data. The table, called a categorization table, is analogous to the well-known computer directory tree structure with expandable and collapsible headings (FIG. 3). More specifically, a plurality of data records 10 are accessed through a sorted index 12. A header table 14 references the plurality of data records 10 through the sorted index 12 (FIG. 1). The sorted index 12 contains a separate entry corresponding to each data record contained in the plurality of data records 10. The header table is traversed to create and display a categorization table on a display means (FIG. 3). Shakib does not, however, teach or suggest marking a second set of columns within a view of a database as if the second set of columns were already sorted and categorized prior to actual sorting and categorizing of the second set of columns. The Examiner admits the same on page 2 of the outstanding Office Action.

Yoshiyama does not cure the above-noted deficiencies of Shakib. Yoshiyama discloses a relational database retrieval method that is based upon a comparison of costs of different retrieval techniques. The method is useful for irregular retrievals

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where an already generated index cannot be used in many cases. In the method, a structured query language (SQL) statement (i.e., query) is parsed (see paragraphs 0046 and 0058; and FIG. 5). Based upon the parsing, a cost calculation is performed to determine the fastest way to access the database (para. 0059). The costs of three retrieval techniques are calculated: (i) access made by entire scanning on all of the data in the database; (ii) access made by using an already existing index or dynamic index; and (iii) access made by creating and using a dynamic index (para. 0063). The technique that is deemed the fastest is used to actually access the database and retrieve the data in response to the query (para. 0063-0066).

However, Yoshiyama does not explicitly disclose a view of a database. Moreover, Yoshiyama does not teach or suggest marking a second set of columns within a view of a database as if the second set were already sorted and categorized prior to actually sorting and categorizing the second set of columns. Instead, Yoshiyama teaches that non-indexed data may be accessed in one of three ways: by a full scan, by using portions of existing indexes, or by creating a new dynamic index. However, there is simply no mention of marking a second set of columns as categorized and sorted before they are actually categorized and sorted, as recited in the claimed invention. Therefore, Shakib and Yoshiyama, alone or in combination, do not teach or suggest all of the features of claim 1.

Moreover, even assuming *arguendo* that Yoshiyama does disclose the above-noted features, which Applicants do not concede, there is no proper motivation for modifying Shakib with such features. Shakib is directed to a method of displaying all of the data contained in a plurality of data records. The data is displayed in a

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categorization table that may have expanded or collapsed headings. All of the data in the data records or sort index is necessarily categorized and sorted before it can be displayed (col. 6, lines 33-35). Since Shakib is concerned with displaying all of the data, there would be no motivation to leave some of the data un-categorized and un-sorted. Therefore, there would be no motivation to mark a subset of columns categorized and sorted before they are actually categorized and sorted.

Furthermore, and contrary to the Examiner's assertion, modifying Shakib with such features would not "speed up data retrieval" in Shakib. In fact, Shakib is not directed toward data retrieval in the same sense as Yoshiyama. Instead, Shakib is directed toward the creation and display of a categorization table that may have expanded or collapsed headings (see FIG. 3). Yoshiyama, on the other hand, is directed toward a database management system (DBMS) and the selective retrieval of data from a database based upon SQL statements (i.e. queries). Shakib makes no mention whatsoever of a DBMS or queries. Therefore, the motivation proffered by the Examiner is inapposite to Shakib, and therefore is insufficient to support a *prima facie* case of obviousness with respect to claim 1.

Applicants submit that the Examiner has failed to properly establish a *prima facie* case of obviousness with respect to independent claims 7, 18, and 25. The Examiner states that "[c]laims 7, 10-13, 17-18, 20-25 are rejected under the same rationale as stated in claims 1-6 arguments" (see page 4 of the Office Action). Initially, Applicants note that claims 7, 18, and 25 contain different features that are not present in claims 1-6, and therefore, by definition, cannot be rejected using the same rationale as was used to reject claims 1-6.

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For example, independent claim 7, as amended, recites a non-relational database. Neither Shakib nor Yoshiyama teaches or suggests a non-relational database. In fact, Yoshiyama appears to teach away from non-relational databases. For example, Yoshiyama explicitly states that their invention relates to a relational database (para. 0002). Moreover, Yoshiyama discloses that the invention parses SQL statements. Those skilled in the art will recognize that SQL is a language that provides an interface to relational database systems. Therefore, the rationale as stated in the rejection of claims 1-6 does not teach or suggest all of the features of claim 7.

Furthermore, independent claim 18 recites a system comprising components. Claims 1-6 are directed to a method, and do not contain the features of a system and components. Therefore, the rationale as stated in the rejection of claims 1-6 by definition does not teach or suggest all of the features of claim 18.

Even further, independent claim 25 recites a computer program product comprising a computer usable medium having readable program code embodied in the medium, the computer program product including a first computer program code, a second computer program code, and a third computer program code. Claims 1-6 are directed to a method, and do not contain the features of a computer program product, computer usable medium, and program code. Therefore, the rationale as stated in the rejection of claims 1-6 by definition does not teach or suggest all of the features of claim 25.

In any event, as described above, no proper combination of Shakib and Yoshiyama teaches or suggests marking a second subset of columns of a view of a database as categorized and sorted when the columns haven't actually been

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categorized and sorted, as recited in the claimed invention. Therefore, the applied references do not teach or suggest all of the elements of claims 7, 18, and 25.

Dependent Claims 2-6, 10-13, 17 and 20-24

Applicants respectfully submit that dependent claims 2-6, 10-13, 17 and 20-24 depend from an allowable independent claim, and are allowable by virtue of the allowability of the respective independent claim.

Moreover, the applied references do not teach or suggest many of the features of the dependent claims. For example, the Examiner has failed to even assert that the applied references teach or suggest a component to permit clients to see the second set of columns and to issue a query on the at least one column of the second set of columns, as recited in claim 24.

Accordingly, Applicants respectfully request that the rejection over claims 1-7, 10-13, 17-18 and 20-25 be withdrawn.

Claims 8-9, 14-16 and 19

The Examiner asserts that it would have been obvious to modify Shakib in view of Yoshiyama and further in view of Wilkes, and that the resultant combination teaches or suggests all of the elements of claims 8-9, 14-16 and 19. Applicants respectfully disagree.

As discussed above, no proper combination of Shakib and Yoshiyama teaches or suggests marking a second subset of columns of a view of a database as categorized and sorted before the second subset of columns are actually categorized and sorted.

Wilkes does not teach or suggest these features, and thus does not cure the deficiencies of Shakib and Yoshiyama with respect to the independent claims.

Moreover, Wilkes does not teach or suggest the elements of claims 8-9, 14-16 and 19. For example, Wilkes does not teach or suggest assigning a first set of columns of a view of database in a cache, as recited in claim 8. To the contrary, Wilkes does not even mention a database. Wilkes is discloses a method for storing data in a segments of a cache. However, Wilkes makes no mention whatsoever of storing portions of a database in the cache. Therefore, the applied references do not teach or suggest every element of the claimed invention.

Accordingly, Applicants respectfully request that the rejection over claims 8-9, 14-16 and 19 be withdrawn.
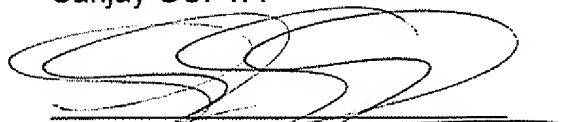

Other Matters

Claims 21 and 22 have been amended to correct the claim dependencies to provide proper antecedent basis for recited elements.

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CONCLUSION

In view of the foregoing amendments and remarks, Applicants submit that all of the claims are patentably distinct from the prior art of record and are in condition for allowance. The Examiner is respectfully requested to pass the above application to issue. The Examiner is invited to contact the undersigned at the telephone number listed below, if needed. Applicants hereby make a written conditional petition for extension of time, if required. Please charge any deficiencies in fees and credit any overpayment of fees to Attorney's Deposit Account No. 09-0457.

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